

The IOF MC PrintTech project

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Map printing for orienteering - Observations

- Traditional spot colour offset printing
 - Print shops / printers
 - Cheap for large runs. Large formats possible
 - High start-up cost (one plate per colour)
 - Inconvenient (and expensive) course overprinting
- CMYK printing
 - Print shop or private
 - Low startup cost for non-offset
 - Most competitive for small runs. Smaller sizes: A4-A3
 - Convenient (flexible) and cheaper course overprinting

IOF PrintTech project - Purpose

- Monitor the development of new printing technologies
 - Collect samples and experiences
- Disseminate information
- Update rules and guidelines (?)

PrintTech project

Autumn 2002	Project started Project leader: Jukka Liikari , IOF MC
October 2002	Request for map samples and experiences (technical details) -> All member federations
2002-2003	Received maps (from 7 member countries)
	Sample reviewing
2004-2005	First project deliverables
2005-	Project continues

Map printing for IOF events - rules

- Ski-O
 - Good quality non-offset allowed
 - *Emphasis on ski-tracks, little emphasis on other details*
 - *Colour important (visibility of green tracks and purple overprint)*
- MTBO
 - Good quality non-offset allowed
 - *Emphasis on rideable tracks, little emphasis on other details*
- Trail-O
 - Good quality non-offset allowed
 - *Map reading while standing still*
- Foot-O
 - **Only spot colour offset** printed maps allowed
 - *Small details (in many colours) are important for navigation / map reading. Map reading at high running speed in rough terrain*

PrintTech - Main Quality Issues

- Graphical resolution
 - Dots per inch (ISOM)
- Colour and Appearance
 - Standard colours (ISOM)
 - Overprinting effect (ISOM)
 - Reflections
- Durability
 - Paper
 - Colour

PrintTech - Other Issues

- Price
 - Cost / map
- Time consumption
 - Copies / minute
- Convenience
 - Course overprinting
 - Competition timetable
 - Map scale

Printing technologies

- Spot colour offset printing
- Process colour (CMYK) offset printing
- Laser / LED printers
- Ink-jet / Bubble-jet printers
- Dye sublimation printers
- Thermal wax / Solid ink-jet printers
- Colour copiers

ISOM & printing I

Resolution

- *Maximum deviation in symbol dimensions allowed on the final map: +/- 5%*
- Minimum line thickness (black, green, blue and brown):
 - 0.12 mm 415 - distinct cultivation boundary
 - 0.12 mm 407/409 - undergrowth
 - 0.10 mm 310/311 - marshes
 - 0.14 mm 101 contour
- ISOM demands - printing resolution (minimum):
 - 0.10mm: 5080 dpi
 - 0.14mm: 3628 dpi
- ISOM 1990 (+/- 20%):
 - 0.10mm: 1270 dpi.
 - 0.14mm: 906 dpi.

ISOM & printing II

Colour

- *PMS colours*
 - Colour appearance depends both on the paper and the ink/pigment. PMS inks are paper type specific
- CMYK equivalents?
 - Cyan, Magenta and Yellow can vary from printer to printer
 - Settings are also paper specific
- Colour calibration

ISOM & printing III

Paper

- *Good, possibly water resistant paper*
- *80-120 g/m²*
- *Suitable paper for orienteering*
 - *Matte, coated paper*
 - *Not completely white*
 - *(In Norway: G-Print, 110g)*

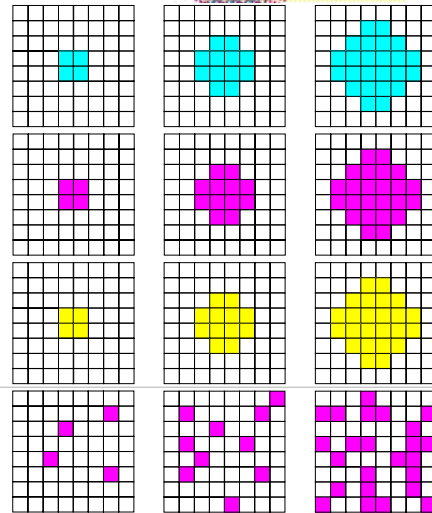
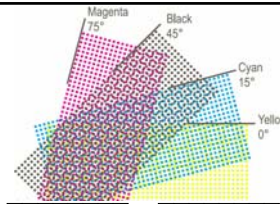
ISOM & Overprinting - translucency - transparency

- *Simulated overprinting effect, not transparency / translucency!*
 - *Difficult!*
 - *Orienteering map software does not currently do a good job simulating the overprinting effect*
 - *Specialist job(?)*
- *Postscript level 2-3 supports (some kind of) overprinting*
 - *Not device-independent!*

```
true setoverprint
1 0 1 1 setcmykcolor
20 20 100 80 rectfill
%%(+ setoverprintmode)
```

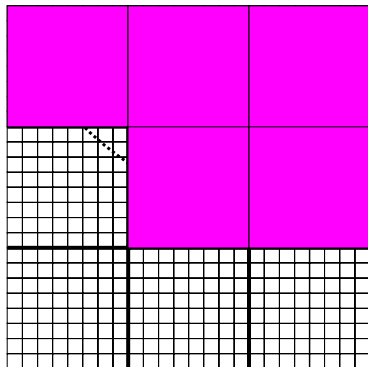
Graphical resolution

- Maximum resolution
 - example: 1200 dpi
- Effective non-CMYK colour resolution (spot colour "simulation")
 - Regular raster
 - Stochastic / Frequency Modulated

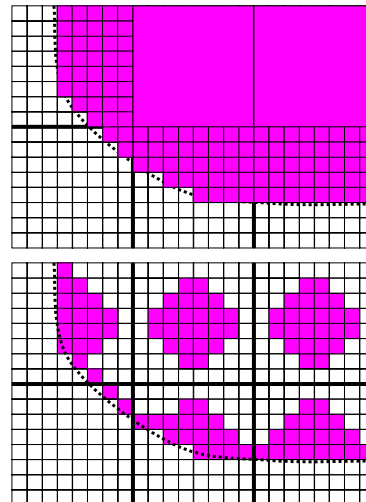


Edge rendering

- effective resolution



- utilising max resolution



Colour

- Toner (laser/LED)
 - The use of oil/wax - glossy -> reflections ☹️
 - Artificial toner (polymer)
 - smaller particles, more evenly sized
 - cheaper technology, less energy required, less toner usage
- Ink
 - Liquid
 - Solid

Standard colours - the future

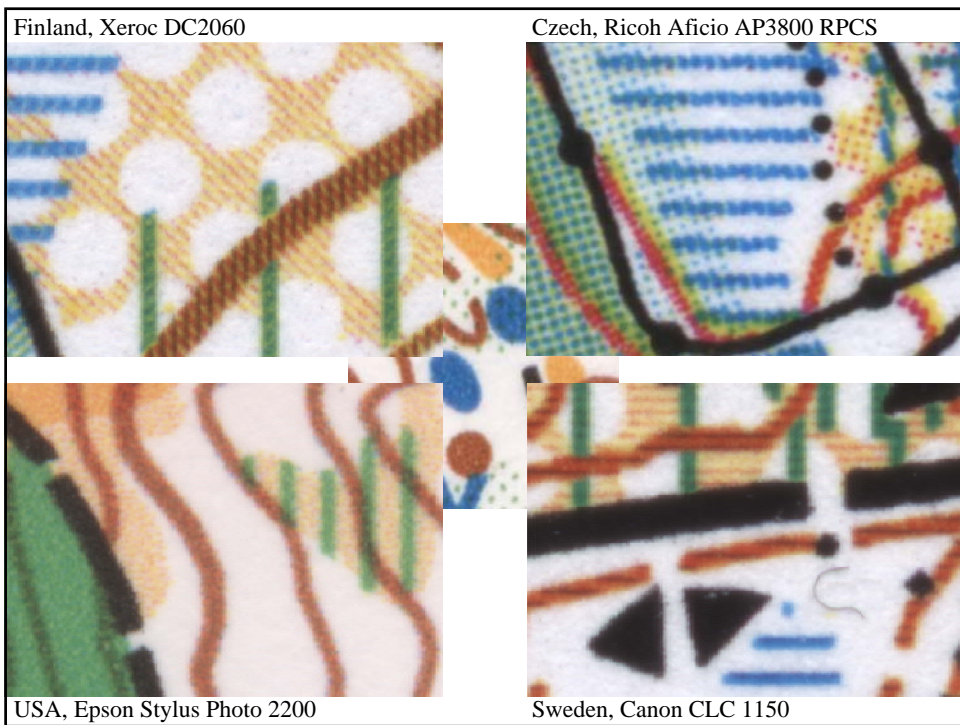
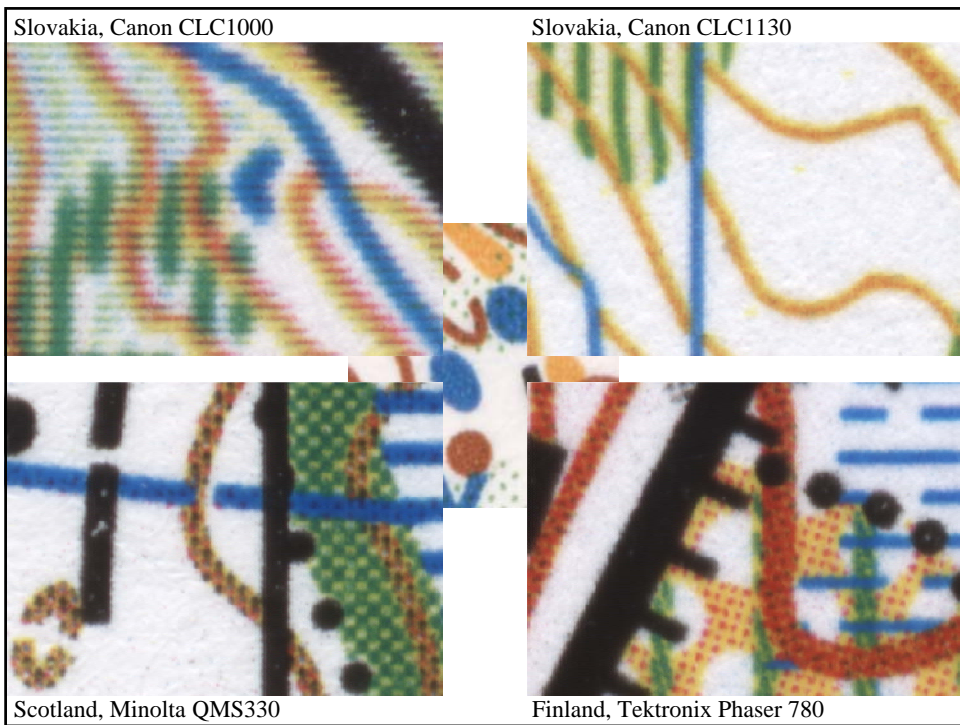
- Either
 - Support for PMS in printers / printer drivers (self-calibration)
 - Produce print files specifying layers of PMS colours in print order and the nature of the overprint effect (simulate offset spot colour printing)
- Or
 - Some new colour system?
- Or
 - ...

Pros and Cons - non-offset CMYK printing

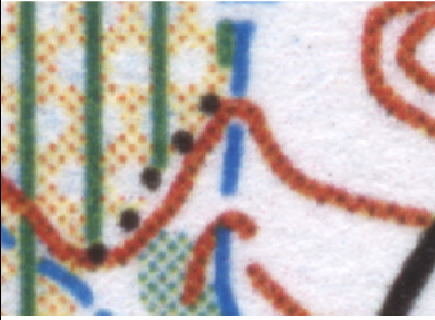
<i>Aspect</i>	<i>Advantage</i>	<i>Disadvantage</i>
Price	"Small" numbers Concurrent course overprinting	Maps for other purposes? One course per file may be necessary
Resolution	CMYK is approaching spot colour offset printing	CMYK is still inferior compared to spot colour printing. A big problem for the contours (brown colour)
Course printing	Easy and fast	Overprinting effect must be ensured
Timetable	A few days faster than traditional	Continuous updating may cause problems!
ISOM colours	Adjusting colours is possible	Need for frequent colour calibration, yellow is difficult, brown is very important
Other colours	Can produce millions of colours	The ISOM overprinting effect is currently not supported device-independently by Postscript printers. The software has to do the "Rip'ing" (time consuming and error prone!).
Durability		Ex. hard paper and surface colours
Water resistance		Ex. colours that are not water resistant
Cold resistance		Ex. colours that fade in cold conditions
Appearance		Ex. glossy colour / glossy paper

Samples, PrintTech project

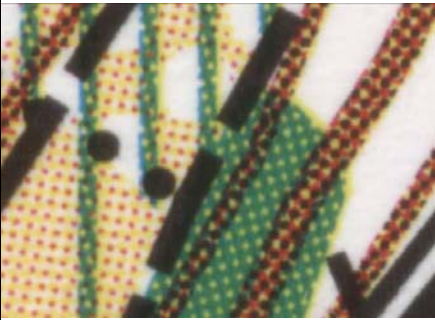
Scanned with an
Epson Perfection 3200 Photo
Settings: 24 bit colour, 3200 dpi



Sweden, Minolta QMS 330



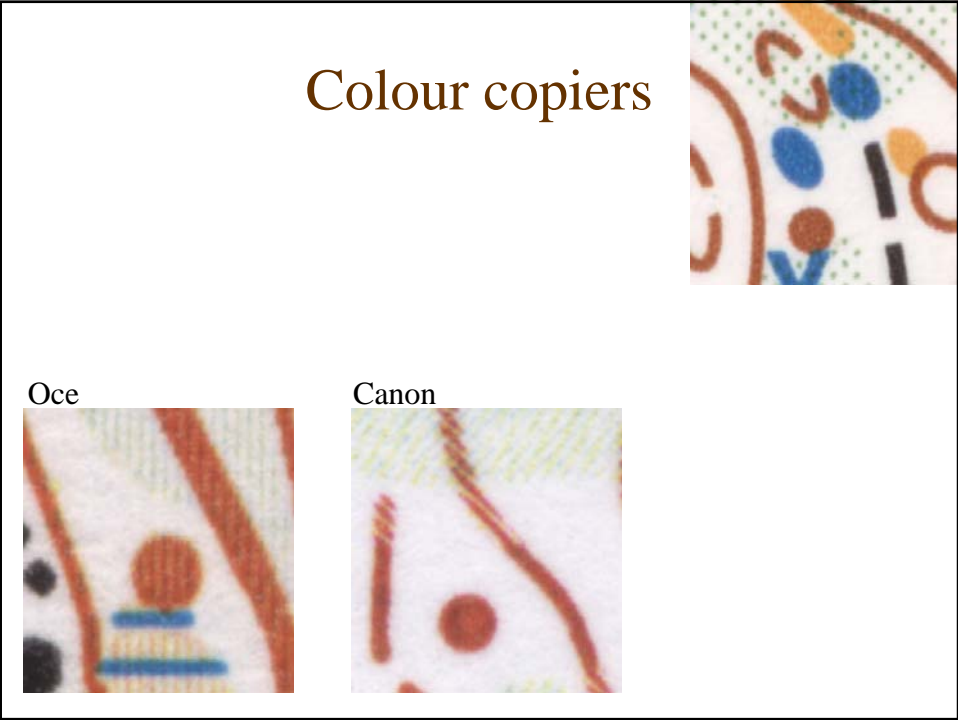
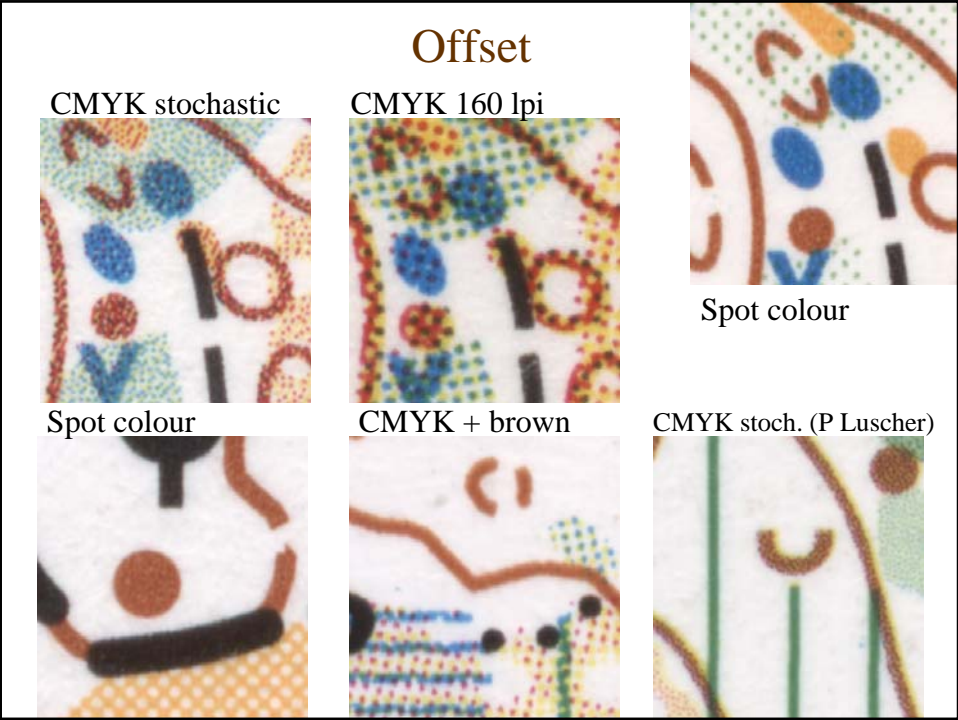
Great Britain, Xerox DC12

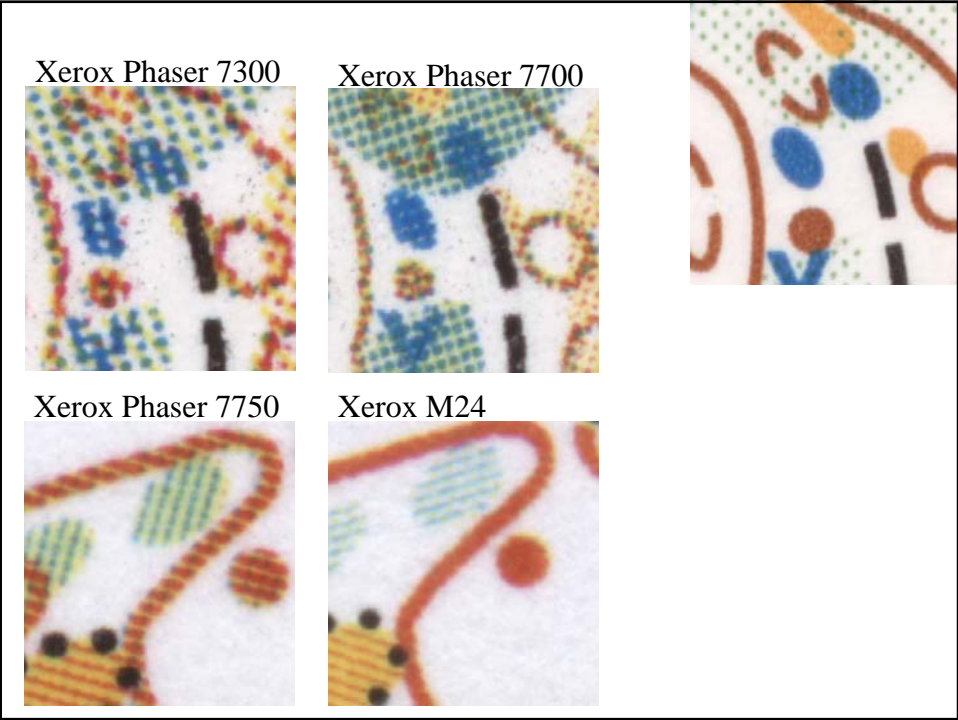
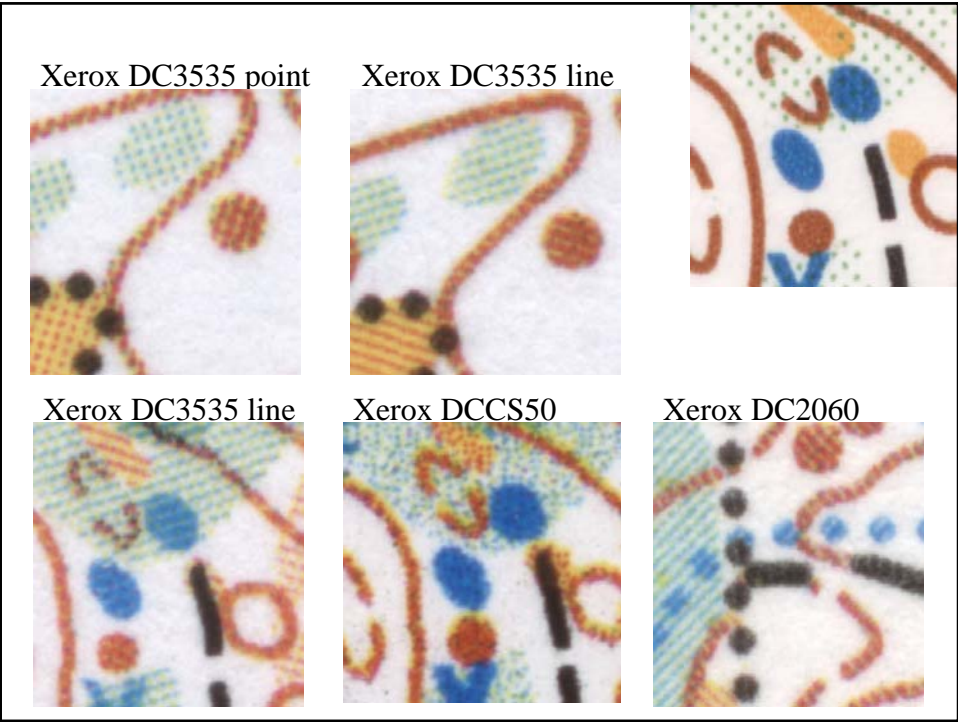


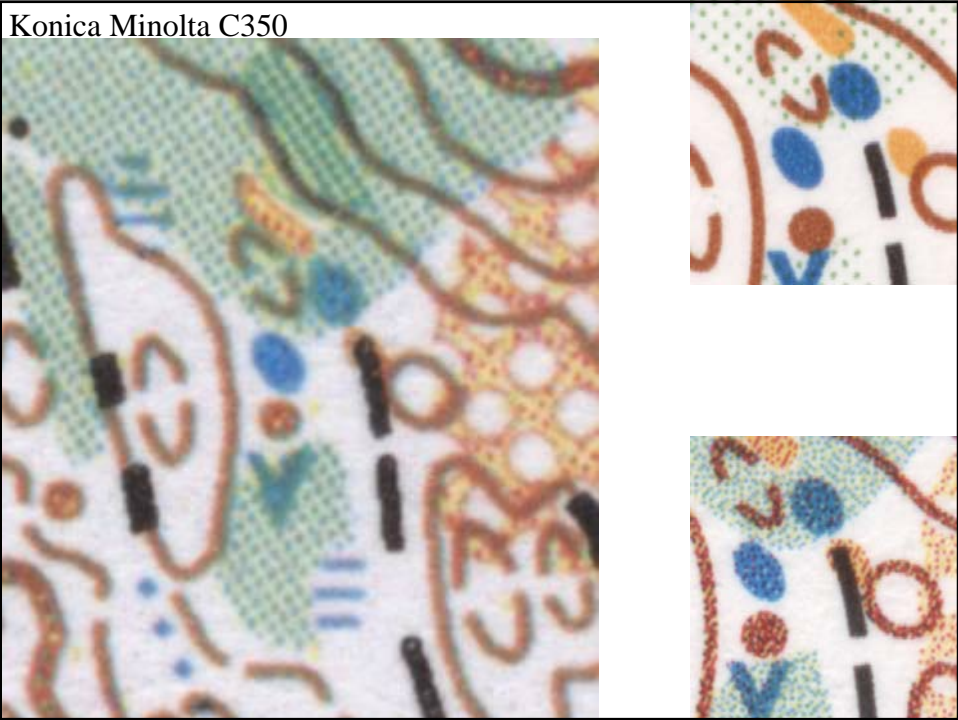
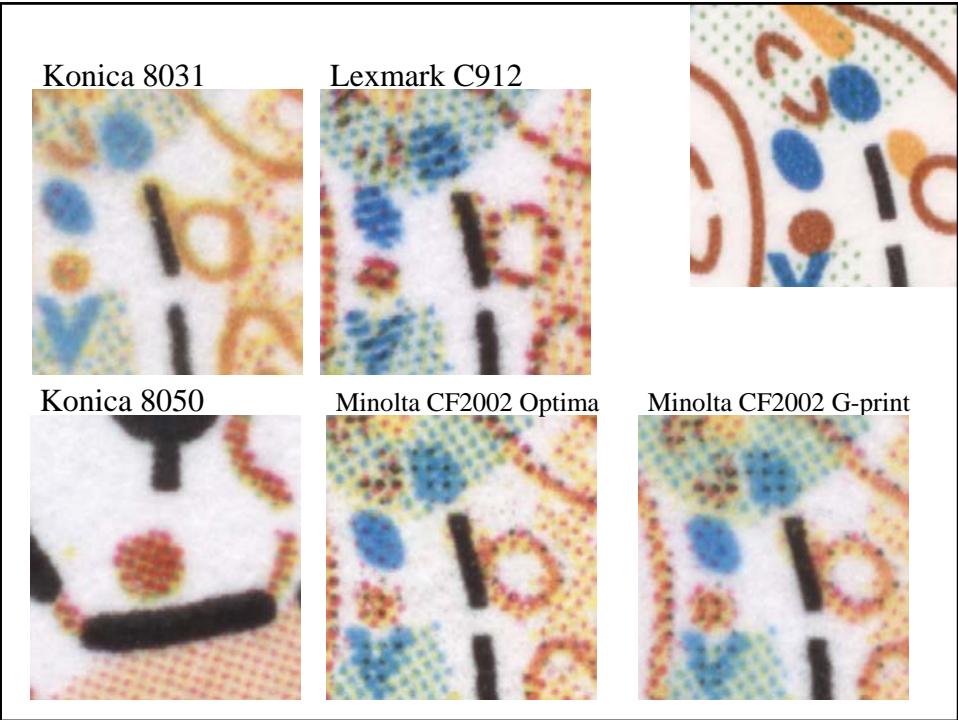
Great Britain Heidelberg Speedmaster

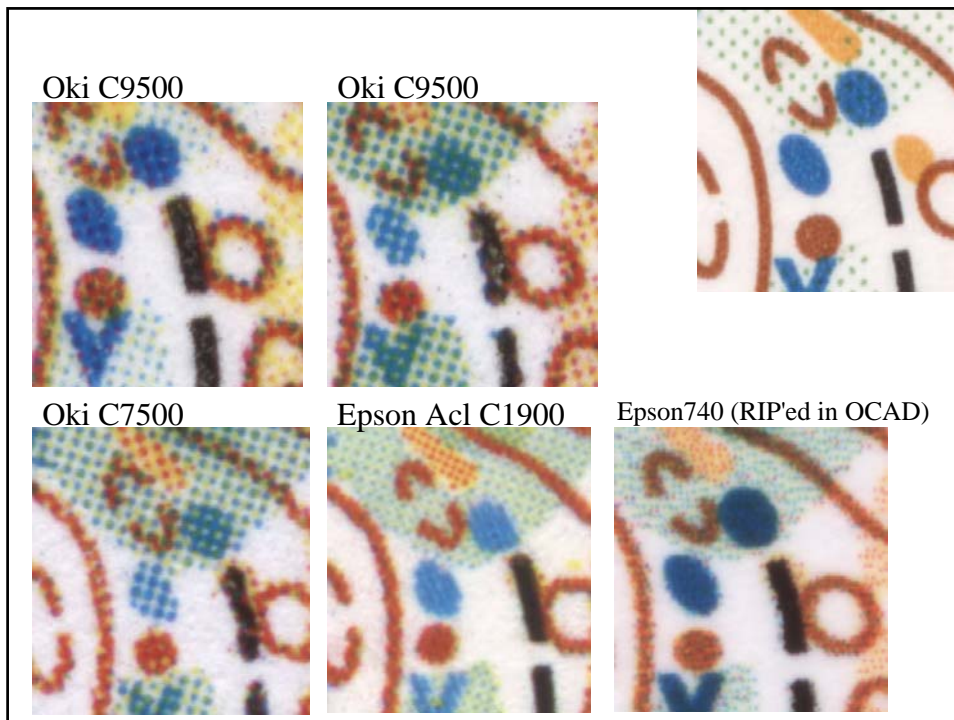


Other samples









Watch the IOF MC Web pages!

Link at
www.orienteering.org